ATTACHMENT F.1

CLOSURE PLAN FOR THE TECHNICAL AREA 55 CONTAINER STORAGE UNITS

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LIST OF ABBREVIATIONS/ACRONYMS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
ALARA	as low as reasonably achievable
COPC	constituents of potential concern
CSU	container storage unit(s)
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
PPE	personal protective equipment
QA	quality assurance
QC	quality control
R&D	research and development
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SWRC	Solid Waste Regulatory Compliance Group
TA	technical area

ATTACHMENT F.1
CLOSURE PLAN FOR THE TECHNICAL AREA 55 CONTAINER STORAGE UNITS

The information provided in this closure plan is submitted to address the applicable closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC) §270.14(b)(13), and 20.4.1 NMAC, Subpart V, Part 264, Subparts G and I, revised June 14, 2000 [6-14-00]. This closure plan describes the activities necessary to perform Resource Conservation and Recovery Act (RCRA) closure for the container storage units (CSU) at Los Alamos National Laboratory (LANL) Technical Area (TA) 55. Closure will include removal of any remaining waste, decontamination or removal of contaminated equipment/structures, and verification that all residues have been removed. Closure activities will minimize the need for further maintenance, preclude the release of hazardous waste or hazardous constituents to environmental media, and be protective of human health in accordance with the closure performance standards in 20.4.1 NMAC § 264.111 [6-14-00].

Container storage at TA-55 consists of seven CSUs including B40, B05, K13, B45, and the Vault located at TA-55-4; a container storage pad located northwest of TA-55-4; and TA-55-185 (Figure F.1-1). This closure plan will be used to provide guidance and permit conditions for the partial closure of these TA-55 CSUs. Closure will occur separately and over the active life of the TA-55 facility, which is not anticipated to end before 2050.

This closure plan describes general closure activities and establishes the procedure of submitting a separate detailed CSU-specific sampling and analysis plan (SAP) to the New Mexico Environment Department (NMED) for approval at the time of closure. The CSU-specific SAPs will alleviate the need for future closure plan and permit modifications until the actual closure activities for each CSU are scheduled. Each SAP will provide the required level of detail to assure that closure performance standards are met and will be consistent with the appropriate decontamination and verification requirements existing at the time of closure.

This plan is organized as follows:

- Section F.1.1 - General Closure Information
- Section F.1.2 - Description of the TA-55 CSUs
- Section F.1.3 - Closure Procedures
- Section F.1.4 - Sampling and Analysis Plan

- Section F.1.5 - References

Until closure is complete and has been certified in accordance with 20.4.1 NMAC §264.115 [6-14-00], as discussed in Section F.1.1.6, a copy of the approved closure plan and any approved revisions will be on file with the Risk Reduction and Environmental Stewardship Division Solid Waste Regulatory Compliance Group (SWRC) and at the U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA) Los Alamos Site Office (LASO).

F.1.1 GENERAL CLOSURE INFORMATION

F.1.1.1 Closure Performance Standard [20.4.1 NMAC §264.111]

The CSUs addressed in this closure plan will be closed to meet the following performance standards:

- Minimize the need for further maintenance,
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or atmosphere, and
- Comply with the closure and post-closure requirements of 20.4.1 NMAC, Subpart V, Part 264, Subpart G and I [6-14-00].

This will be accomplished by removal of waste from each TA-55 CSU and decontamination, if necessary, of the areas that may have come into contact with wastes. Decontamination activities will ensure the removal of hazardous waste residues from each TA-55 CSU to established cleanup levels.

F.1.1.2 Partial and Final Closure Activities [20.4.1 NMAC §264.112(d)]

This closure plan has been written for partial closure rather than final closure of the entire LANL facility. Partial RCRA closure is the closure of a hazardous waste management unit at a facility that contains other active hazardous waste management units. Partial closure at TA-55 will consist of closing one or more of the CSUs, while leaving the other units at LANL in operation. Partial closure (hereinafter referred to as closure) will be deemed complete when the waste has been removed from the CSU; the CSU all related surfaces and equipment have been decontaminated, if necessary, or otherwise properly disposed; closure has been verified; and the closure certification has been submitted to and approved by the NMED.

Final RCRA closure of the LANL hazardous waste management facility will occur when all of LANL's hazardous/mixed waste management units are closed. Final closure will consist of assembling documentation on the closure status of each waste management unit, including all pervious closures as well as land-based units where closures have been or are being addressed via alternative closure requirements. Final closure will be deemed complete when the closure certification has been submitted to the NMED, and the NMED has approved the final closure.

F.1.1.3 General Closure Schedule [20.4.1 NMAC §§264.112(b)(6), 264.112(e), and 264.113]

Written notification will be provided to the NMED 45 days before the start of closure activities at any TA-55 CSU. However, pursuant to 20.4.1 NMAC §264.112(e) [6-14-00], removing hazardous and/or mixed wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1 NMAC §264.112(d)(2) [6-14-00]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1 NMAC §264.113(a) [6-14-00], within 90 days after final receipt of waste at the CSU to be closed. This timeframe will be met as long as facilities are available for treatment or disposal of these wastes. In the event that closure activities cannot begin within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1 NMAC §264.113(a) [6-14-00]. Closure activities and reporting requirements will then be completed within 180 days of the receipt of the final volume of waste at the CSU to be closed. Closure will be conducted in accordance with the schedule presented in Table F.1-1 of this closure plan.

Table F.1-1

Closure Schedule

Activity	Maximum Time Required [a]
Submit CSU-specific SAP	-90 Days
Notify the NMED of intent to close.	-45 Days
Final receipt of waste.	Day 0
Remove waste.	Day 5
Decontaminate surfaces and equipment.	Day 20
Sample excess used decontamination water for disposal.	Day 20
Perform verification sampling.	Day 30
Evaluate analytical data from verification sampling.	Day 50
Perform additional decontamination, if necessary.	Day 55
Perform additional verification sampling, if necessary.	Day 60
Evaluate additional analytical data.	Day 75
Perform final cleanup and disposal (i.e., removal of decontaminated equipment and decontamination waste).	Day 140
Certify closure.	Day 175
Submit closure certification to NMED.	Day 180

a The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.

NMED = New Mexico Environment Department

SAP = Sampling and Analysis Plan

Further details regarding the schedule of closure activities on a CSU-specific basis will be included with the CSU-specific SAP as discussed in Section F.1.4 of this closure plan. In the event that closure is prevented from proceeding according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1 NMAC §264.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1 NMAC §264.113(a)(1) and (b)(1) [6-14-00], will be made in accordance with 20.4.1 NMAC §264.113(c) [6-14-00].

F.1.1.4 Amendment of the Closure Plan [20.4.1 NMAC §264.112(c)]

In accordance with 20.4.1 NMAC §264.112(c) [6-14-00], LANL will submit a written notification or request for a permit modification to authorize a change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the closure plan.
- There is a change in the expected year of closure.
- Unexpected events occur during closure that requires modification of the approved closure plan.
- The owner or operator requests the Secretary of the NMED to apply alternative requirements to a regulated unit under 20.4.1 NMAC §§ 264.90(f) and/or 264.110(c).

The written notification or request will include a copy of the amended closure plan for approval by the NMED.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

F.1.1.5 Closure Cost Estimate, Financial Assurance, and Liability Requirements [20.4.1 NMAC §264.140(c)]

In accordance with 20.4.1 NMAC §264.140(c) [6-14-00], LANL, as a federal facility, is exempt from the requirements of 20.4.1 NMAC, Subpart V, Part 264, Subpart H [6-14-00], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

F.1.1.6 Closure Certification [20.4.1 NMAC §264.115]

Within 60 days after completion of closure activities at any TA-55 CSU or final closure of the facility, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the unit or facility has been closed in accordance with the approved closure plan. The certification will be signed by the appropriate DOE/NNSA and LANL officials and by an independent, registered professional engineer, in accordance with 20.4.1 NMAC §264.115 [6-14-00]. Documentation supporting the independent, registered engineer's certification will be furnished to the Secretary of the NMED upon request, as specified in 20.4.1 NMAC §264.115 [6-14-00]. A copy of the certification and supporting documentation will be maintained by both DOE/NNSA LASO and SWRC.

F.1.1.7 Security

Because of the ongoing nature of waste management operations at TA-55, security and administrative controls at the TA-55 waste management units will be maintained by the DOE/NNSA or another authorized federal agency for as long as necessary to prohibit public access. The security fence at TA-55 will be maintained to ensure that public access into TA-55 is prevented.

F.1.1.8 Closure Reports

Upon completion of the RCRA closure activities at any TA-55 CSU, a closure report will be prepared and submitted to the Secretary of the NMED. The report will document the closure and contain, for example, the following:

- A copy of the certification described in Section F.1.1.6 of this closure plan.
- A general summary of closure activities.
- Any significant variance from the approved activities and the reason for the variance.
- A summary of any sampling data associated with the closure
- Storage or disposal location of hazardous/mixed waste resulting from closure activities.
- A certification of accuracy of the report.

F.1.1.9 Survey Plat and Post-Closure Requirements [20.4.1 NMAC §264.116 and 264.117 through 264.120]

LANL intends to remove hazardous/mixed waste and associated constituents from the CSU to be closed and decontaminate all surfaces and equipment to established cleanup levels or, if the cleanup levels approved in the CSU-specific closure SAP cannot be achieved, to dispose of the contaminated surfaces and equipment. If decontamination to established cleanup levels approved in the CSU-specific closure SAP cannot be achieved, LANL may propose an alternate demonstration of decontamination, as circumstances indicate.

If a CSU cannot be closed as described above, LANL will conduct post-closure or equivalent activities in accordance with Appendix G in the most recent version of the "Los Alamos National Laboratory General Part B Permit Application," hereinafter referred to as the LANL General Part B. A survey plat prepared in accordance with 20.4.1 NMAC §264.116 [6-14-00] will be filed with the appropriate authorities at certification of closure, as described in that regulation. A survey plat indicating the location and dimensions of the CSU with respect to permanently surveyed benchmarks will be submitted to the local zoning authority (i.e., Los Alamos County) and to the NMED at the time of submission of the certification of closure. The plat filed with the local zoning authority will contain a prominently displayed note, which states the obligation of LANL and DOE/NNSA to restrict disturbance of the unit in accordance with the applicable regulations in 20.4.1 NMAC, Subpart V, Part 264, Subpart G. Post-closure notices will be filed with appropriate authorities, as described in 20.4.1 NMAC §264.119 [6-14-00]. To meet that requirement, DOE/NNSA will file a "Land Use Restriction Notice" or equivalent document with the County of Los Alamos and other authorized agencies. Within 60 days after completions of the established post-closure care period for the unit, LANL will submit to the Secretary of the NMED, via certified mail, a certification of completion of post-closure care in accordance with the requirements of 20.4.1 NMAC §264.120 [6-14-00].

F.1.2 DESCRIPTION OF THE TA-55 CSUs

TA-55 is located on a mesa between a branch of Mortandad Canyon to the north and Two Mile Canyon to the south. Mesa-top elevations at TA-55 range from approximately 7,100 to 7,300 feet above mean sea level. TA-55 began operating in 1978 and is the location of research and development activities including a plutonium processing facility. Container storage at TA-55 consists of seven CSUs including B40, B05, K13, B45, and the Vault located at TA-55-4; a container storage pad located northwest of TA-55-4; and TA-55-185. Table F.1-2 provides the location and dimensions of each CSU.

Table F.1-2
Container Storage Units at Technical Area 55

Container Storage Unit	Location	Dimensions
B40	TA-55-4, Basement	L-shaped, long dimensions of 61.5 ft x 55 ft
B05	TA-55-4, Basement	26 ft x10 ft
K13	TA-55-4, Basement	16 ft x 13 ft
B45	TA-55-4, Basement	45 ft x 17.5 ft
Vault	TA-55-4, Basement	79.5 ft x 50.5 ft
Storage Pad	Northwest of TA-55-4	Trapezoid that is 102 ft x 86 ft x 156 ft x 105 ft and a 70 ft x 10 ft rectangle on the side.
TA-55-185	West of TA-55-4	60 ft x 40 ft

TA = Technical Area
ft = feet/foot

LANL does not currently intend to reduce the design capacities of the CSUs at TA-55 during the active life of the units. Estimated annual quantities for the CSUs at TA-55 are provided in the most recent version of the "Los Alamos National Laboratory General Part A Permit Application," hereinafter referred to as the LANL General Part A.

F.1.2.1 Estimate of Maximum Waste in Storage

The maximum total inventory of waste that can be in storage at any time in the TA-55 CSUs is provided in Table F.1-3.

Table F.1-3
Maximum Container Storage Unit Capacities at Technical Area 55

CSU	Capacity[a] (gallons)
B40	21,500
B05	3,600
K13	2,500
B45	11,000
Vault	4,000
Storage Pad	135,000
TA-55-185	30,000

a Reflects the calculation of maximum capacities with a minimum aisle space of 2 feet.

TA = Technical Area
CSU = container storage unit

Table F.1-4 provides the date storage began at each CSU and estimates the maximum amount of hazardous and/or mixed waste in storage over the life of the unit.

Table F.1-4
Estimated Total Storage Capacity at the Technical Area 55 Container Storage Units

CSU	Approximate Storage Dates	Estimated Total Storage Capacity[a] (gallons)
B40	1980 - 2050	3,010,000
B05	1980 - 2050	504,000
K13	1980 - 2050	350,000
B45	1980 - 2050	1,540,000
Vault	1980 - 2050	560,000
Storage Pad	1980 - 2050	18,900,000
TA-55-185[b]	2005 - 2050	2,700,000

[a] Calculated based upon turn over of the maximum storage capacity twice a year
[b] Assumed that 2005 is the year storage at the unit will begin

F.1.2.2 Description of Stored Waste

The hazardous waste that may be stored at TA-55 is generated during research and development (R&D) activities, decontamination and decommissioning (D&D) projects, and general facility operations. A waste is considered hazardous if it meets the definition of a solid waste described in 20.4.1 NMAC §261.2 [6-14-00]; is not exempt from regulation as a hazardous waste under 20.4.1 NMAC §261.2 [6-14-00]; and exhibits any of the characteristics of hazardous waste identified in 20.4.1 NMAC, Subpart II, Part 261, Subpart C, or is listed in 20.4.1 NMAC, Subpart II, Part 261, Subpart D [6-14-00]. Mixed wastes currently stored at TA-55 are generated during R&D activities, processing and recovery operations, D&D projects, and general facility operations. Mixed waste is any solid waste that has both a hazardous component (as defined by 20.4.1 NMAC, Subpart II, Part 261) and a radioactive component. Information on the hazardous components of all wastes that can be stored at the TA-55 CSUs is provided in the most recent version of the LANL General Part A. Additional information on waste generating activities at LANL is available in the waste analysis plan in Appendix B of the most recent version of the LANL General Part B.

The estimated annual quantities of waste in storage at the TA-55 CSUs are provided in the most recent version of the LANL General Part A.

F.1.3 CLOSURE PROCEDURES

Closure will be conducted in accordance with the schedule presented in Table F.1-1, as amended by the CSU-specific SAPs submitted at the time of closure. Closure will generally be conducted as follows:

- **Removal of Waste** - Includes the transportation of all waste containers remaining in storage at the time of closure.
- **Preliminary Closure** – Determination of safety precautions and background contaminant

levels for the CSU to be closed. Includes the inspection of the CSU by the engineer observing the closure to ensure adequate containment and conditions for closure.

- **Decontamination** – Includes the removal of potential hazardous and/or mixed waste constituents from equipment used during waste management activities (e.g., pallets, drum dollies) and all structures, surfaces, walls, and secondary containment features (e.g., surfaces, sumps, berms, and/or recessed drains). Removal can include sweeping, vacuuming, moping, and/or wiping as appropriate at the time of closure and will be based upon the contaminant levels determined by the operating record of the unit.
- **Verification** – Sampling to verify that residual hazardous waste constituents have been decontaminated to appropriate levels. Sample media can include swipes, solutions, and/or soil as appropriate to the CSU being closed and will be determined at the time of closure based upon the operating record of the unit.
- **Closure Certification –** Certification by a professional engineer that the procedures and requirements provided in this closure plan and the CSU-specific SAPs were followed.

The following sections provide additional information for the closure procedures described above. The CSU-specific SAPs provided at the time of closure will provide detailed information regarding the preliminary closure procedures, decontamination methods, and verifications procedures as applicable at the time of closure.

F.1.3.1 Removal of Waste

Prior to initiation of closure activities, all wastes will be removed from the CSU scheduled for closure. Containers may be removed from each location with forklifts. Small containers may be handled manually or with dollies. Containers will be placed onto flatbed trucks, or trailers, or other appropriate vehicles for transport. Appropriate shipping papers will accompany the wastes during transport. Containers holding hazardous or mixed wastes will be moved to an approved on-site CSU or permitted off-site treatment, storage, or disposal facility.

F.1.3.2 Preliminary Closure Procedures

F.1.3.2.1 Safety Precautions

Job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted, in accordance with LANL safety procedures. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE), specified by the Health Physics Group and the Industrial Hygiene and Safety Group, and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE that will be required will depend upon the physical hazards present and the levels of contamination that are detected, if any. All workers involved in closure activities will be required to have appropriate training (as identified in Attachment D of this permit application and Appendix D in

the most recent version of the LANL General Part B. Contaminated PPE will either be decontaminated or managed in compliance with appropriate waste management regulations.

F.1.3.2.2 Background Determination

Prior to the commencement of decontamination, the operating record of the CSU to be closed will be evaluated to determine the constituents of potential concern (COPCs) during closure. In addition, background samples and/or concentrations derived from LANL studies developed under the LANL corrective action or other programs can be used to determine COPC background/baseline levels applicable at the time of closure. The COPCs, appropriate background levels, and/or necessary sample collection techniques will be determined at the time of closure and included in the CSU-specific SAP at the time of closure, as discussed in Section F.1.4 of this closure plan.

F.1.3.2.3 Structural Assessment

Prior to beginning decontamination activities, the CSU to be closed will be inspected for any cracks or conditions that would potentially lead to the loss of decontamination wash water containment, as applicable. Preventative maintenance inspections are conducted routinely (i.e., weekly) at each CSU. If any defects, deterioration, damage, or hazards affecting containment are discovered during inspection, appropriate remedial actions (including repairs, maintenance, or replacement) will be completed before decontamination activities begin. If a crack or gap is present, a swipe sample or a representative sample of the media will be taken (e.g., asphalt or concrete) to determine the presence of contamination. The sample will be analyzed for the COPCs identified based upon the operating history of the unit, as discussed in Section F.1.3.2.2. If contamination is detected, the surface flaw will be decontaminated prior to repairing the crack/gap. Complete or partial removal (e.g., cold milling) of the material may be performed until contamination is no longer detected. If partial removal is successful in eliminating the contamination, it will be assumed that the remaining material, including the underlying soil, is clean.

F.1.3.3 Decontamination Procedures

To the extent possible, all contaminated surfaces and equipment (if present) will be decontaminated. Surfaces, items, materials, and equipment that cannot be decontaminated will be containerized and managed in compliance with appropriate waste management regulations.

An appropriate surfactant/solvent to be used in wash water solutions will be determined based upon the COPCs identified in the CSU-specific SAP. Alconox®, a surfactant, will be used to decontaminate

the CSUs. Specialized solvents will be used for more focused decontamination/removal purposes, as appropriate.

F.1.3.3.1 Equipment Located in the CSUs

The TA-55 CSUs have a variety of equipment that will be removed, decontaminated, and/or disposed of prior to decontamination of the surfaces associated with the unit. This includes all portable equipment such as grating/supports, pallets, drum dollies, and carts that are used to manage waste at the CSU. This equipment will be removed, decontaminated and/or disposed based upon the level of contamination and future use.

F.1.3.3.2 Indoor Storage Locations

Decontamination will be conducted using mops, cloths, and/or other absorbent materials to remove any potential hazardous constituents. These materials will be submerged in a wash water solution (e.g., Alconox, water) and used to wipe down the surfaces associated with the CSU being closed. After decontamination of the surfaces, the containment system (e.g., recessed areas, sumps, berms) will be wiped down. Used wash water will be collected, removed, and transferred to an appropriate container for storage pending the results of analysis and disposal.

Verification of decontamination will be conducted as indicated in Section F.1.3.4. If the analysis from the verification sampling indicates that hazardous constituents are present, decontamination wash cycles and analyses will continue until the structure and surfaces have been decontaminated or the decision is made to manage it appropriately as contaminated waste. Upon determination that it is contaminated waste, the material/structure/surface may be removed, transported to, and stored at other CSUs to facilitate the closure process.

F.1.3.3.3 Vault

It is anticipated that the Vault will remain an active mixed waste management unit until the LANL facility closure and that the area will be decontaminated in the manner described above. If “as low as reasonably achievable” (ALARA) considerations preclude decontaminating the area in the aforementioned manner, alternative measures will be initiated, as necessary, to ensure that the area is closed in a manner consistent with ALARA requirements and the intent of the closure regulations contained herein.

F.1.3.3.4 Container Storage Pad

Closure activities at the outdoor asphaltic-concrete container storage pad will include decontamination, and/or removal. To decontaminate the surface of the container storage pad, procedures similar to those described in Section F.1.3.3.2 of this closure plan can be used. If the decision is made to decontaminate, portable berms or other devices designed to collect and provide containment for used wash water will be used to control runoff from the CSU.

Used wash water samples from the container storage pad may exhibit contamination due to leaching of the asphalt during washdown. If this is the case, record reviews (e.g. manufacturer's specifications, Material Safety Data Sheets) and additional analyses may be performed to determine if leaching from the asphalt contributed to the contaminant concentration in the used wash water. If this additional evaluation confirms the asphalt as the source of contamination, baseline concentrations for clean wash water will be adjusted accordingly.

If decontamination verification, as discussed in Section F.1.3.4 cannot be demonstrated after two wash cycles, the asphaltic-concrete pad will be removed from the site and managed as appropriate for the waste type.

F.1.3.3.5 Soil Sampling

At the TA-55 container storage pad CSU soil removal can also be used to meet the closure performance standards if the operating records for the unit indicate that a release of hazardous waste to the surrounding soil has occurred. If records indicate that no release of hazardous waste to soils has occurred, soil sampling will not be conducted.

If collection of soil samples is determined to be necessary to demonstrate decontamination, appropriate background sample and/or concentrations derived from LANL studies (Section F.1.3.2.2) will be used to determine background/baseline levels for decontamination verification. Sampling locations to determine the extent of contamination will be based upon a biased random sampling approach, including historical evidence or releases, physical evidence of distressed vegetation or visual staining, and any other information that indicates a potential contamination pathway. The number of samples, locations, depths, and sampling will be determined before closure and will be included in the TA-55 CSU-specific closure SAP, as discussed in Section F.1.4. Results from sampling will be compared to the background samples and/or baseline concentration levels included in the closure SAP. If analysis shows that the soil at the outdoor container storage pad is contaminated, soil sampling results that are above the background/baseline levels will be used to identify the extent of

soil contamination. Contaminated soils will either be treated in place or removed in layers and sampling conducted following removal of each layer. This procedure will be used to minimize the amount of soil removed.

F.1.3.3.6 Equipment Used During Closure

Reusable protective clothing, tools, and equipment used during decontamination activities at the CSU will be cleaned with a wash water solution. If reusable sampling equipment is used, sampling equipment rinsate blanks will be collected and analyzed in accordance with the quality assurance (QA)/quality control (QC) procedures to be described in the closure SAP. Reusable decontamination equipment, including protective clothing and tools used during closure activities will be scraped as necessary to remove any residue and cleaned with a wash water solution. Residue, disposable equipment and reusable equipment that cannot be decontaminated will be containerized and managed as waste in accordance with LANL waste management procedures, depending on the regulated constituents present.

F.1.3.4 Verification of Decontamination

Verification of decontamination will be conducted using sampling and analysis to demonstrate that hazardous and/or mixed waste residues are not present on the surfaces of the CSU. Sample media can include wash water solutions, swipes, and/or solid media samples (e.g., soil, concrete) as determined in the CSU-specific SAP at the time of closure and the operating record of the unit. The sampling methodology will be based on factors such as COPCs and the CSU materials of construction. All sampling conducted during closure will be done in accordance with the QA/QC procedures defined by “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods” (U.S. Environmental Protection Agency [EPA], 1986). The CSU-specific SAP will establish the minimum number of verification samples to be collected for the CSU being closed. The sample number will be based on the total surface area associated with the unit. Verification sampling will use a biased random approach for the determination of sample locations for the equipment, structures, and/or surfaces of the CSU and will include known or likely areas of contamination (e.g., low areas, sumps, and known spill locations) as determined by the operating record of the unit at the time of closure.

Decontamination will be verified if the analytical data from the collected samples meets at least one of the decontamination criteria listed in Section F.1.3.5 of this closure plan. If the data cannot meet at least one of the criteria, additional sampling can be performed to establish the boundaries of the contamination. Decontamination, as discussed in Section F.1.3.3, will be repeated within those boundaries, using portable berms or other appropriate materials to limit the potential for runoff from the

affected area. An additional round of verification sampling will be performed for all of the areas previously determined to be contaminated. After each decontamination/verification sequence, a decision will be made to repeat or remove the contaminated materials and dispose of them properly.

F.1.3.5 Decontamination Criteria

Successful decontamination will consist of sampling as specified in the TA-55 CSU-specific SAP and meet one of the following four criteria:

- No detectable hazardous waste or hazardous waste constituents from container storage activities are identified in the verification sample.
- Detectable hazardous waste or hazardous waste constituents from container storage activities in the verification solution sample are removed to statistically significant levels based on baseline concentrations in the clean verification sample.
- Detectable hazardous waste or hazardous waste constituents from container storage activities in the verification solution sample are at or below levels agreed upon with the NMED.
- Detectable hazardous waste or hazardous waste constituent concentrations from container storage activities do not significantly decrease after several wash downs. In such an event, hazardous constituents that pose an acceptable risk will be allowed to remain, as mutually agreed upon with the NMED.

An alternative demonstration of decontamination may be proposed and justified at the time of closure as circumstances dictate. The NMED will evaluate the proposed alternative in accordance with the standards and guidance then in effect and, if approved, LANL will incorporate the alternative into the SAP at the time of closure.

F.1.4 SAMPLING AND ANALYSIS PLAN

Sampling and analysis will be performed using standard approved methods (e.g., *SW-846*, American Society for Technology and Materials), as appropriate, for making closure decontamination verification determinations. LANL will submit a TA-55 CSU-specific closure SAP to the NMED at the time of each CSU closure notification for review and approval. Each SAP will provide a detailed description of the CSU to be closed and propose a closure methodology that assures the closure performance standards in Section F.1.1.1 are met.

The TA-55 CSU-specific SAPs will include the following information:

- A detailed discussion of site characteristics.
- The CSU operational history, to include descriptions of known spills, releases, and/or evidence of potential problems (e.g., visual stains, dead vegetation, solid waste management units).

- Chemical properties of the waste stored at the CSU.
- Determination of applicable COPCs.
- A hazard control plan, including a review of chemical hazards present at the site, control and monitoring methods and procedures, and required PPE.
- Determination of wash water solution composition, if necessary.
- Detailed procedures describing decontamination methods for equipment , structures, and media.
- Discussion of background levels determined through sampling or use of published data and their relevance to the specific CSU.
- Methods for sampling and analysis of contaminated media.
- Removal procedures for contaminated media, if necessary.
- Sampling methods for decontamination media and hazardous waste determination. The discussion should include the rationale for using wash water samples, swipe samples, soil samples, and/or other sampling methodology.
- Sampling methods for decontamination verification procedures. The discussion should include the statistical or judgmental basis for determining the number of verification samples needed and the constituents to be analyzed.
- Sampling equipment decontamination and disposition procedures.
- Sample handling and documentation procedures.
- Analytical methods (including detection limits) and the rationale for their determination.
- Disposition of removed waste, decontamination media, or contaminated soils. This discussion should include an identification of proposed on- or off-site hazardous waste management facilities that may be used for final disposition and the types of wastes anticipated to be shipped.
- Decontamination criteria.
- Statistical basis for verification of decontamination, if applicable. The discussion should include information on determination of statistical increases in analytical parameters and numerical values for significant increases.
- Risk assessment procedures to be used, if necessary.
- Field and laboratory QA/QC procedures.
- Schedule of closure activities, including decontamination, sampling, analysis, potential removal of soils, and closure certification submittal.
- Identification of contact person or office.

F.1.5 REFERENCES

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *EPA-SW-846*, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.